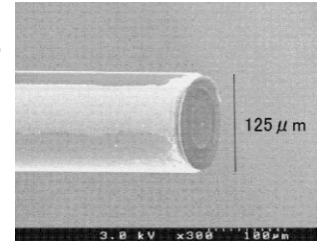
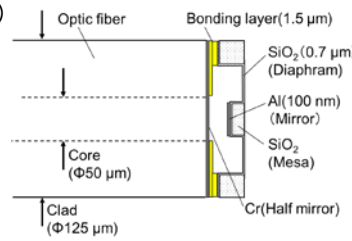


## 24 Start-up companies related to $\mu$ SIC

**MEMSAS Co., Ltd.** (K. Kato, Y. Haga, T. Matsunaga, et al.)

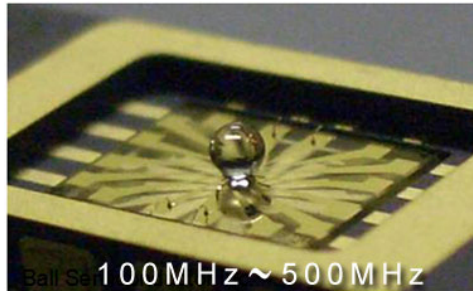
The venture company MEMSAS, aimed at applying MEMS sensor to medical devices such as minimally invasive medical catheters, was established in September 2004.

We are trying to commercialize ultra-miniature fiber-optic pressure sensor for blood pressure monitoring.

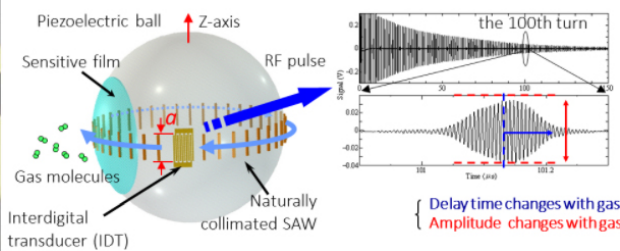


**Ball Wave Inc.** (Shingo Akao, Kazushi Yamanaka, Nobuo Takeda, Yusuke Tsukahara)

<http://www.ballwave.jp/english/index.html>



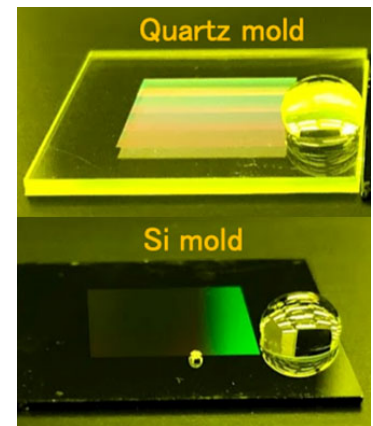
A ball SAW gas sensor



Diffraction-free surface acoustic waves (SAWs) can be generated on a solid sphere and be propagated around the sphere in many turns without spreading if the source width is a geometrical mean of the diameter of the sphere and the wave length of SAWs. A tiny change in the surface elastic properties causes a large variation in the SAW propagation because of the long propagation distance around the sphere in many turns. Depositing a thin sensitive film on the sphere realizes a small ball SAW sensor with a rapid response and a high sensitivity.

**Der Nächste Co., Ltd.** (Masashi Nakao) <http://www.dernaechste.com/>

It is a senior company that was started after retirement. Using  $\mu$ SIC-equipment and foundry manufacturers, we mainly support the study of various manufacturing processes in the research and development stage and cooperate with prototyping. In particular, we are carrying out comprehensive production of imprint technology, which allows nano-pattern transfer with high throughput and low cost, which we have been involved in for many years. In the imprint transfer process, it was usual to create a quartz mold or Si mold (as shown in the photo, there are water droplets to check the releasability) using EB lithography and dry etching, and then transfer the pattern from the mold to the resist. Aiming to simplify the process and improve the transfer accuracy, we are also developing a new etching-free pattern transfer technology using UV-curable PDMS.



**REISense, Inc.** (Shuji Tanaka, Masanori Muroyama, Hideki Hirano)

<https://resense.co.jp/>

We provide MEMS-CMOS integrated tactile sensors and their network systems for next-generation robots with tactile sensing capabilities. We have developed a custom-designed sensor platform LSI using the TSMC 0.13  $\mu$ m CMOS process, and further processed it with wafer-level MEMS technology to fabricate 2.7 mm-square capacitive tactile sensor devices that can detect 3-axis forces. The manufacturing yield exceeds 90%. By utilizing the event-driven response and serial bus communication functions embedded in the integrated LSI, we have successfully connected 100 devices using only six wires and achieved high-speed data acquisition from all 100 devices. Moreover, by using the sensor platform LSI, we can effectively network not only tactile sensors but also a wide variety of other sensors.

